What is claimed is:

1. A capacitor comprising:

a first anode stack having a first number of anode foils;

a second anode stack having a second number of anode foils, where the first number of anode foils is different than the second number of anode foils;

a first connection member attached to the first anode stack, the first connection member having a first section extending over and confronting an edge face of the first anode stack; and

a second connection member attached to the second anode stack, the second connection member having a first section extending over and confronting an edge face of the second anode stack;

wherein the first connection member and the second connection member are connected to each other and wherein the first section of the first connection member is a different size than the first section of the second connection member.

2. The capacitor of claim 1, wherein each of the first anode stack and the second anode stack has a notch and each of the first connection member and second connection member has a second section fitting within the notch and attached to the first section.

3. The capacitor of claim 2, wherein each connection member comprises a main member having a generally L-shaped cross-section.

4. A capacitor comprising:

a case having a curved interior surface; and

first, second, and third capacitor modules, each having an anode stack and a cathode and each having respective first, second, and third edge faces that confront

the curved interior surface of the case, with the third edge face set back from the second edge face and the second edge face set back from the first edge face to define a profile generally congruent to a profile of the curved interior surface;

wherein the first capacitor module anode stack having a first number of anode foils and the second capacitor module anode stack having a second number of anode foils, where the first number of anode foils is different than the second number of anode foils.

5. The capacitor of claim 4, wherein edge portions of each cathode are offset from edge portions of adjacent anode stacks.

6. The capacitor of claim 5, wherein the case has a bottom and the first, second, and third capacitor modules are stacked in ordinal sequence from the bottom, with the first capacitor module closer to the bottom.

7. An implantable medical device comprising the capacitor of claim 4.

8. A capacitor comprising:

an aluminum case having an etched inner surface;

a lid having an etched inner surface attached to the case;

a capacitor stack disposed within the case, the capacitor stack including a plurality of cathode stacks and a plurality of anode stacks, the cathode stacks electrically coupled to a cathode conductive tab, the cathode conductive tab having at least a portion positioned between the case and the lid, wherein the cathode stacks are electrically coupled with the etched inner surfaces of the case and the lid; and

the plurality of anode stacks including a first anode stack disposed adjacent to one of the etched inner surfaces, the first anode stack having a major surface facing

one of the etched inner surfaces and having an electrolyte saturated separator disposed between one of the etched inner surfaces and the major surface.

9. The capacitor of claim 8, wherein the plurality of anode stacks include a second anode stack disposed adjacent to one of the inner surfaces, the second anode stack including at least one conductive layer having a second major surface, the second major surface facing the one of the inner surfaces.

10. The capacitor as recited in claim 8, wherein the case comprises at least 98% aluminum.

11. A capacitor comprising:

an aluminum case having an etched inner surface;

a capacitor stack disposed within the case, the capacitor stack including a plurality of cathode stacks and a plurality of anode stacks, the cathode stacks electrically coupled with the etched inner surface; and

the plurality of anode stacks including a first anode stack disposed adjacent to the etched inner surface, the first anode stack having a major surface facing the etched inner surface of the case and having an electrolyte saturated separator disposed between the etched inner surface and the major surface to facilitate charge storage between the etched inner surface and the major surface;

wherein one or more anode foils include a porous structure and have a formation voltage of approximately 441 volts or greater.

12. The capacitor of claim 11, wherein one or more anode foils have a formation voltage of greater than approximately 600 volts.

13. The capacitor of claim 11, wherein one or more anode foils have a formation voltage between approximately 441 volts and approximately 600 volts.

14. The capacitor of claim 11, wherein the capacitor is a flat capacitor dimensioned to fit within an implantable medical device.

15. A capacitor comprising:

one or more anodes;

a cathode structure comprising a plurality of integrally connected cathode plates, the cathode structure having a serpentine shape, interweaving under and over each of the one or more anodes, wherein each of the one or more anodes is located between a pair of adjacent cathode plates; and

a plurality of separators, at least one of the plurality of separators is located between each of the one or more anodes and each of the plurality of cathode plates.

16. The capacitor of claim 15, wherein the plurality of cathode plates are arranged to form an s-shaped profile.

17. The capacitor of claim 15, wherein the cathode structure comprises a single foil.

18. A cathode for a capacitor, the cathode comprising:

a plurality of cathode plates, each of the plurality of cathode plates is integrally attached to its neighboring plates at a fold area, each of the cathode plates having a major surface, wherein when the cathode is folded at each fold area, the major surface of each cathode plate is substantially parallel to a major surface of an adjacent cathode plate.

19. The cathode of claim 18, wherein the plurality of cathode plates are cut from a single aluminum sheet.

20. The cathode of claim 18, wherein the plurality of cathode plates are foldable to form an s-shaped profile.

21. A method of manufacturing a capacitor, the method comprising:

providing a cathode comprising a plurality of cathode plates, the plurality of plates arranged so that each of the plurality of plates is integrally attached to its neighboring plates, the cathode foldable into a serpentine shape having a plurality of folds;

inserting at least one anode between each of the plurality of folds; and

inserting a separator between each anode and each cathode plate.

22. The method of claim 21, wherein providing a cathode comprises providing a cathode comprising a single foil.

23. The method of claim 21, further comprising positioning the plurality of cathode plates wherein when the cathode is folded, a major surface of each cathode plate is substantially parallel to a major surface of an adjacent cathode plate

24. A feedthrough assembly for a capacitor, the feedthrough assembly comprising:

an electrically conductive member dimensioned to extend at least partially through a feedthrough hole of a case of the capacitor, the conductive member having a passage therethrough.

25. The feedthrough assembly of claim 24, wherein the passage is through an axial portion of the electrically conductive member.

26. The feedthrough assembly of claim 24, wherein the passage defines a mounting section for mounting a terminal.

27. The feedthrough assembly of claim 26, wherein the mounting section comprises a threaded section adapted to couple with a terminal fastener.

28. The feedthrough assembly of claim 24, further comprising an outer member located around the electrically conductive member, the outer member adapted to be attached to a case of the capacitor.

29. A feedthrough assembly for providing an electrical pathway between a capacitor stack within a capacitor case and a component outside the case, the feedthrough assembly comprising:

a first member for electrically connecting the capacitor stack to the component, the first member having a passage adapted to couple with a terminal fastener so that the terminal fastener is removably attachable to the first member; and

a second member for electrically insulating the first member from the case.

30. The feedthrough assembly of claim 29, wherein the passage extends completely through an axial portion of the first member.

31. The feedthrough assembly of claim 29, wherein the second member has a first surface for abutting an inner portion of the case next to a feedthrough hole in the case and a second surface for abutting an edge of the feedthrough hole.

32. The feedthrough assembly of claim 29, wherein the passage includes a threaded section.

33. The feedthrough assembly of claim 32, wherein the threaded section adapted to removably couple with a terminal fastener.

34. A capacitor comprising:

a case having a hole;

a capacitor stack within the case; and

at least one feedthrough assembly located at least partially within the hole and coupled to the capacitor stack, the feedthrough assembly including a conductive member having a passage and an insulative member between the conductive member and the case.

35. The capacitor of claim 34, further comprising a connection tab electrically coupling the capacitor stack to the conductive member, the connection tab having a hole proximate to a portion of the connection tab coupled to the conductive member.

36. The capacitor of claim 35, wherein the passage is through an axial portion of the conductive member and the connection tab hole is adjacent to the passage.

37. The capacitor of claim 36, wherein a continuous passage exists through the feedthrough member passage and the hole.

38. The capacitor of claim 34, wherein the passage includes a mounting section.

39. The capacitor of claim 34, further comprising a terminal for coupling the feedthrough member to a component outside the case and a terminal fastener for attaching the terminal to the feedthrough member.

40. The capacitor of claim 39, wherein the feedthrough member passage has a threaded portion and the terminal fastener has a corresponding threaded portion so that the fastener is removably attachable to the feedthrough member.

41. A method for manufacturing a capacitor, the method comprising:

providing a capacitor case having a hole;

installing a feedthrough assembly at least partially into the hole, the feedthrough assembly comprising a conductive member having a passage therethrough; and

filling the case with an electrolyte solution through the passage.

42. The method of claim 41, further comprising:

installing a terminal fastener in the passage.

43. A method for replacing a first capacitor installed in a medical device with a second capacitor, the method comprising:

disengaging a terminal coupled to the medical device from a feedthrough passage of the first capacitor; and

installing the same terminal into a feedthrough passage of the second capacitor.

44. The method of claim 43, wherein disengaging a terminal coupled to the medical device from a feedthrough passage comprises disengaging a terminal coupled to the medical device from a feedthrough passage located through an axial portion of a electrically conductive member.

45. A capacitor comprising:

a first stack of capacitive elements where each element comprises an anode plate and a cathode plate with an electrolyte interposed therebetween; and,

a second stack of capacitive elements, wherein the first and second stacks are enclosed in separate compartments of a capacitor case that electrically isolate the electrolytes of each stack from one another.

46. The capacitor of claim 45 wherein the first and second stacks are in their separate compartments having a common wall.

47. The capacitor of claim 45 wherein the anode and cathode plates of each stack are electrically isolated from the case and further wherein, for each stack, each anode plate is connected by a conductor and each cathode plate is connected by a conductor, the conductors coupled to respective anode and cathode terminals.

48. The capacitor of claim 47 wherein the cathode terminal of the first stack is electrically connected to the anode terminal of the second stack.

49. The capacitor of claim 47 wherein the conductors are connected to external terminals.

50. The capacitor of claim 46 wherein the cathode terminal of the first stack and the anode terminal of the second stack are electrically connected to the case such that the capacitance between an anode terminal of the first stack and a cathode terminal of the second stack is equivalent to the capacitance of each stack connected in series, the case being conductive and serving as an electrical connection between the stacks.

51. The capacitor of claim 50 wherein the case is enclosed by an insulating coating.

52. The capacitor of claim 45 further comprising a third stack of capacitive elements enclosed in a separate compartment of the capacitor case.

53. A method for constructing a capacitor, comprising:

providing a first stack of capacitive elements where each element comprises an anode plate and a cathode plate with an electrolyte interposed therebetween;

providing a second stack of capacitive elements; and,

enclosing the first and second stacks in separate compartments of a capacitor case that electrically isolate the electrolytes of each compartment.

54. The method of claim 53 further comprising stacking the first and second stacks vertically in their separate compartments separated by a common wall.

55. The method of claim 53 further comprising:

electrically isolating the anode and cathode plates of each stack from the case; and,

for each stack, electrically connecting each anode plate by a conductor and each cathode plate by a separate conductor, the conductors being routed to respective anode and cathode terminals.

56. The method of claim 55 further comprising electrically connecting the cathode terminal of the first stack to the anode terminal of the second stack such that the capacitance between the anode terminal of the first stack and the cathode terminal of the second stack is equivalent to the capacitance of each stack connected in series.

57. The method of claim 55 further comprising routing the conductors via feedthroughs out of the case to external terminals.

58. The method of claim 55 further comprising electrically connecting the cathode terminal of the first stack and the anode terminal of the second stack to the case such that the capacitance between an anode terminal of the first stack and a cathode terminal of the second stack is equivalent to the capacitance of each stack connected in series, the case being conductive and serving as an electrical connection between the stacks.

59. A capacitor comprising:
a conductive case including first and second electrically isolated compartments;
a first stack of one or more capacitive elements in the first compartment; and
a second stack of one or more capacitive elements in the second compartment.

60. The capacitor of claim 59, wherein each capacitive element includes electrolyte between an anode and a cathode.

61. The capacitor of claim 60, wherein the anode of each capacitive element in the first compartment is electrically coupled to the case, and the cathode of each capacitive element in the second compartment is electrically coupled to the case.

62. The capacitor of claim 59, wherein the first and second isolated compartments have a common wall and wherein at least one of the first and second stacks of capacitive elements is stacked in a dimension generally perpendicular to the common wall.

63. An implantable heart rhythm management system comprising:

a capacitor case; and

means for preventing development of excessive pressure within the capacitor case.

64. The implantable heart rhythm management device of claim 63 wherein the means comprises at least one of a semi-permeable membrane, a valve, and an expandable bung.

65. An implantable heart rhythm management device comprising:

one or more leads for sensing electrical signals of a patient or for applying electrical energy to the patient;

a monitoring circuit for monitoring heart activity of the patient through one or more of the leads; and

a therapy circuit for delivering electrical energy through one or more of the leads to a heart of the patient, wherein the therapy circuit includes one or more capacitors, each comprising:

a capacitor case including a portion having opposing interior and exterior surfaces, with the portion having a hole; and

a semi-permeable membrane adjacent the hole to regulate passage of fluids through the hole.

66. The implantable heart rhythm management device of claim 65, wherein the semi-permeable membrane comprises PTFE.

67. The implantable heart rhythm management device of claim 65 wherein the semi-permeable membrane comprises a gas-permeable membrane.

68. A capacitor comprising:

one or more capacitor modules;

a case at least partially enclosing the one or more capacitor modules; and

means for preventing development of excessive pressure within the capacitor case.

69. The capacitor of claim 68 wherein the means comprises at least one of a semi-permeable membrane, a valve, and an expandable bung.

70. A capacitor comprising:

one or more capacitor modules, each comprising an anode and a cathode;

a capacitor case at least partially enclosing the one or more capacitor modules and including a portion having a hole; and

a semi-permeable membrane adjacent the hole to regulate passage of fluids through the hole.

71. The capacitor of claim 70, wherein the semi-permeable membrane comprises PTFE.

72. The capacitor of claim 70, wherein the semi-permeable membrane comprises a gas-permeable membrane.

73. The capacitor of claim 70, wherein the portion of the capacitor having the hole has opposing interior and exterior surfaces, with the interior surface confronting the one or more capacitor modules and wherein the semi-permeable membrane abuts the exterior surface.

74. The capacitor of claim 70, wherein the case is cylindrical.

75 The capacitor of claim 70, wherein the case is flat.

76. A capacitor comprising:
one or more capacitor modules, each comprising an anode and a cathode;
a capacitor case at least partially enclosing the one or more capacitor modules and including a portion having a hole; and
a valve adjacent the hole to regulate passage of fluids through the hole.

77. The capacitor of claim 76, wherein the valve comprises a cantilever spring, with one end of the cantilever spring fixed relative a surface of the capacitor case and another end attached to a valve seat.

78. The capacitor of claim 76, wherein the valve seat comprises a generally convex and elastic structure.

79. The capacitor of claim 76, wherein the case is cylindrical.

80. The capacitor of claim 76, wherein the case is flat.

81. A capacitor comprising:
one or more capacitor modules, each comprising an anode and a cathode;
a capacitor case at least partially enclosing the one or more capacitor modules and including a portion having a hole; and
a bladder adjacent the hole to receive fluids passing through the hole.

82. The capacitor of claim 81, further comprising a bung within the hole, the bung having an axial passage coupled to an interior volume of the bladder and an interior volume of the capacitor case.

83. The capacitor of claim 81, wherein the case is cylindrical.

84. The capacitor of claim 81, wherein the case is flat.

85. The capacitor of claim 81, wherein the capacitor case comprises a conductive metal.

86. A capacitor comprising:

a capacitor case having a vent aperture; and

gas-exchange means for permitting gas molecules to pass through the vent aperture and restricting passage of liquid molecules.

87. A method of operating an electrolytic capacitor having an interior and exterior, the method comprising:

charging or discharging the capacitor one or more times;

venting gases from the interior of the capacitor to the exterior of the capacitor.

88. The method of claim 87 wherein venting gases from the interior to the exterior comprises channeling the gas through a hole in the capacitor case.

89. The method of claim 87 wherein venting gases from the interior to the exterior comprises channeling the gas through a semi-permeable membrane adjacent a hole in the capacitor case.

90. The method of claim 87 wherein venting gases from the interior to the exterior comprises channeling the gas through a valve adjacent a hole in the capacitor case.

91. The method of claim 87 wherein venting gases from the interior to the exterior comprises displacing an object away from a hole in the capacitor case.

92. The method of claim 87 wherein venting gases from the interior to the exterior comprises channeling the gas through a hole in the capacitor case into an expandable non-metallic bladder.

93. An implantable medical device comprising:

a therapy circuit for delivering electrical energy, wherein the therapy circuit includes one or more capacitors, each of the one or more capacitors comprising:

a case; and

a capacitor stack within the case, the capacitor stack comprising:

a plurality of anodes;

a cathode structure comprising a plurality of integrally connected cathode plates, the cathode structure having a serpentine shape, interweaving under and over each anode; and

a plurality of electrolyte impregnated separators, at least one of the plurality of electrolyte impregnated separators located between each anode and each cathode plate.

94. An implantable medical device comprising:

a therapy circuit for delivering electrical energy, wherein the therapy circuit includes one or more capacitors, each of the one or more capacitors comprising:

a case;

a capacitor stack within the case; and

a feedthrough assembly for electrically coupling the capacitor stack to a component outside the case, the feedthrough assembly comprising:

a conductive member having a mounting section adapted to couple with a terminal fastener, the terminal fastener for removably attaching a terminal to the feedthrough assembly; and

an insulative member for insulating the conductive member from the case.

95. The device of claim 94, wherein the mounting section comprises a passage extending completely through the conductive member.

96. The device of claim 95, wherein the feedthrough assembly is coupled to the capacitor stack by an electrically conductive tab, the tab having a portion at least partially covering the passage, the portion having a hole so that a continuous passage exists through the feedthrough passage and the hole.

97. A method for manufacturing an implantable medical device, the method comprising:

providing a case having circuitry;

providing a capacitor case having a hole;

installing a feedthrough assembly at least partially into the hole, the feedthrough assembly comprising a conductive member having a passage;

mounting a terminal to the passage; and

coupling a conductor coupled to the circuitry to the terminal.

98. The method of claim 97, wherein the feedthrough assembly includes an outer non-conductive member located around the conductive member.

99. The method of claim 98, wherein the outer member is attached to the capacitor case.